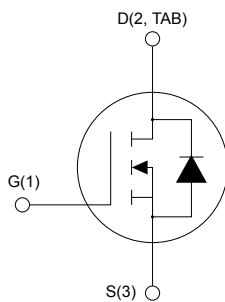
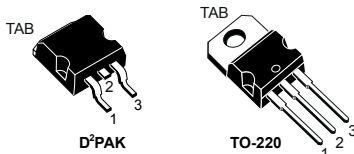


## Automotive N-channel 75 V, 9.5 mΩ typ., 80 A STripFET II Power MOSFET in a D<sup>2</sup>PAK and TO-220 packages




AM01475v1\_noZen



### Features

Order code	V <sub>DS</sub>	R <sub>DS(on)</sub> max.	I <sub>D</sub>
STB76NF75	75 V	11 mΩ	80 A
STP76NF75			

- AEC-Q101 qualified 
- Exceptional dv/dt capability
- 100% avalanche tested
- Low gate charge

### Applications

- Switching applications

### Description

These Power MOSFETs have been developed using STMicroelectronics' unique STripFET process, which is specifically designed to minimize input capacitance and gate charge. This renders the devices suitable for use as primary switch in advanced high-efficiency isolated DC-DC converters for telecom and computer applications, and applications with low gate charge driving requirements.

#### Product status links

[STB76NF75](#)

[STP76NF75](#)

#### Product summary

Order code	STB76NF75
Marking	B76NF75
Package	D <sup>2</sup> PAK
Packing	Tape and reel
Order code	STP76NF75
Marking	P76NF75
Package	TO-220
Packing	Tube

# 1 Electrical ratings

**Table 1. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain-source voltage ( $V_{GS} = 0\text{ V}$ )	75	V
$V_{DGR}$	Drain-gate voltage ( $R_{GS} = 20\text{ k}\Omega$ )	75	V
$V_{GS}$	Gate-source voltage	$\pm 20$	V
$I_D$	Drain current (continuous) at $T_C = 25\text{ }^\circ\text{C}$	80	A
	Drain current (continuous) at $T_C = 100\text{ }^\circ\text{C}$	70	
$I_{DM}^{(1)}$	Drain current (pulsed)	320	A
$P_{TOT}$	Total power dissipation at $T_C = 25\text{ }^\circ\text{C}$	300	W
$dv/dt^{(2)}$	Peak diode recovery voltage slope	12	V/ns
$E_{AS}^{(3)}$	Single-pulse avalanche energy	700	mJ
$T_{stg}$	Storage temperature range	-55 to 175	$^\circ\text{C}$
$T_J$	Operating junction temperature range		$^\circ\text{C}$

1. Pulse width limited by safe operating area.
2.  $I_{SD} \leq 80\text{ A}$ ,  $di/dt \leq 300\text{ A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ .
3. Starting  $T_J = 25\text{ }^\circ\text{C}$ ,  $I_D = 40\text{ A}$ ,  $V_{DD} = 37.5\text{ V}$ .

**Table 2. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thJC}$	Thermal resistance, junction-to-case	0.5	$^\circ\text{C}/\text{W}$
$R_{thJA}$	Thermal resistance, junction-to-ambient	62.5	$^\circ\text{C}/\text{W}$

## 2 Electrical characteristics

$T_C = 25\text{ °C}$  unless otherwise specified.

**Table 3. On/off states**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}$ , $I_D = 250\text{ }\mu\text{A}$	75	-	-	V
$I_{DSS}$	Zero gate voltage drain current	$V_{GS} = 0\text{ V}$ , $V_{DS} = 75\text{ V}$	-	-	1	$\mu\text{A}$
		$V_{GS} = 0\text{ V}$ , $V_{DS} = 75\text{ V}$ , $T_C = 125\text{ °C}^{(1)}$	-	-	10	
$I_{GSS}$	Gate body leakage current	$V_{DS} = 0\text{ V}$ , $V_{GS} = \pm 20\text{ V}$	-	-	$\pm 100$	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}$ , $I_D = 250\text{ }\mu\text{A}$	2	3	4	V
$R_{DS(on)}$	Static drain-source on-resistance	$V_{GS} = 10\text{ V}$ , $I_D = 40\text{ A}$	-	9.5	11	m $\Omega$

1. Specified by design, not tested in production.

**Table 4. Dynamic**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$g_{fs}$	Forward transconductance	$V_{DS} = 15\text{ V}$ , $I_D = 40\text{ A}$	-	20	-	S
$C_{iss}$	Input capacitance	$V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$ , $V_{GS} = 0\text{ V}$	-	3700	-	pF
$C_{oss}$	Output capacitance		-	730	-	pF
$C_{rSS}$	Reverse transfer capacitance		-	240	-	pF
$Q_g$	Total gate charge	$V_{DD} = 60\text{ V}$ , $I_D = 80\text{ A}$ , $V_{GS} = 0\text{ to }10\text{ V}$ (see Figure 14. Test circuit for gate charge behavior)	-	117	160 <sup>(1)</sup>	nC
$Q_{gs}$	Gate-source charge		-	27	-	nC
$Q_{gd}$	Gate-drain charge		-	47	-	nC

1. Specified by design, not tested in production.

**Table 5. Switching times**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on delay time	$V_{DD} = 37.5\text{ V}$ , $I_D = 45\text{ A}$ , $R_G = 4.7\text{ }\Omega$ , $V_{GS} = 10\text{ V}$ (see Figure 13. Test circuit for resistive load switching times and Figure 18. Switching time waveform)	-	25	-	ns
$t_r$	Rise time		-	100	-	ns
$t_{d(off)}$	Turn-off delay time		-	66	-	ns
$t_f$	Fall time		-	30	-	ns

**Table 6. Source-drain diode**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	Source-drain current		-	-	80	A
$I_{SDM}^{(1)}$	Source-drain current (pulsed)		-	-	320	A
$V_{SD}^{(2)}$	Forward on voltage	$I_{SD} = 80 \text{ A}$ , $V_{GS} = 0 \text{ V}$	-	-	1.5	V
$t_{rr}$	Reverse recovery time	$I_{SD} = 80 \text{ A}$ , $di/dt = 100 \text{ A}/\mu\text{s}$ ,	-	132	-	ns
$Q_{rr}$	Reverse recovery charge	$V_{DD} = 25 \text{ V}$ , $T_J = 150 \text{ }^\circ\text{C}$	-	660	-	nC
$I_{RRM}$	Reverse recovery current	(see Figure 15. Test circuit for inductive load switching and diode recovery times)	-	10	-	A

1. Pulse width limited by safe operating area.
2. Pulsed: pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5%.

## 2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

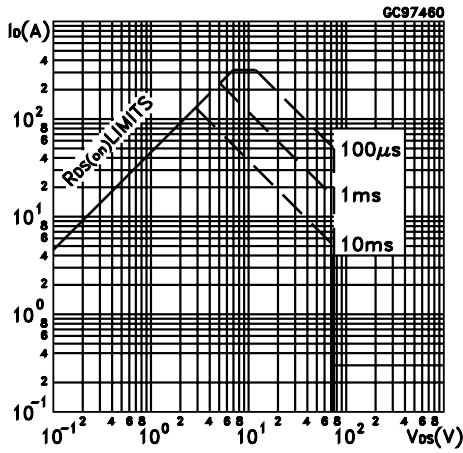


Figure 2. Thermal impedance

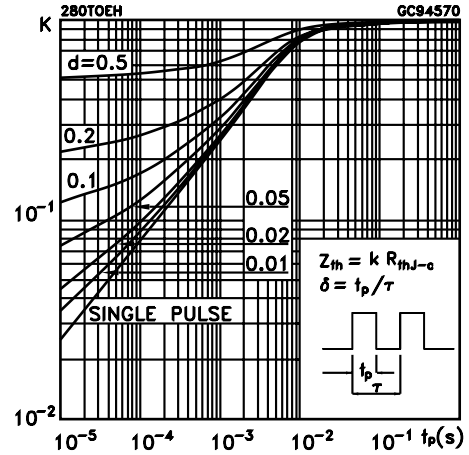


Figure 3. Output characteristics

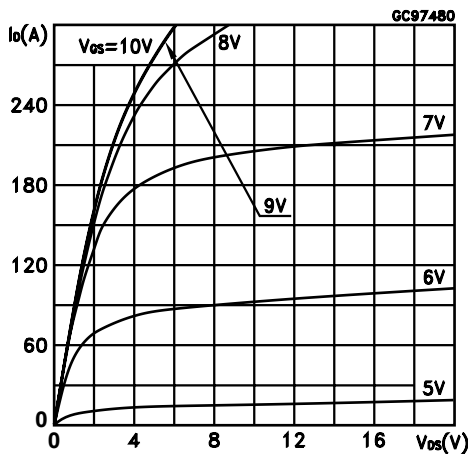


Figure 4. Transfer characteristics

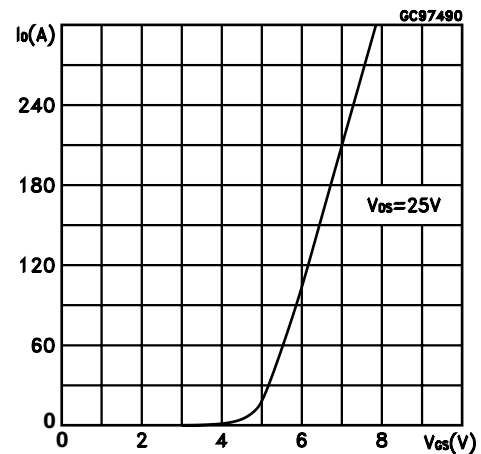


Figure 5. Transconductance

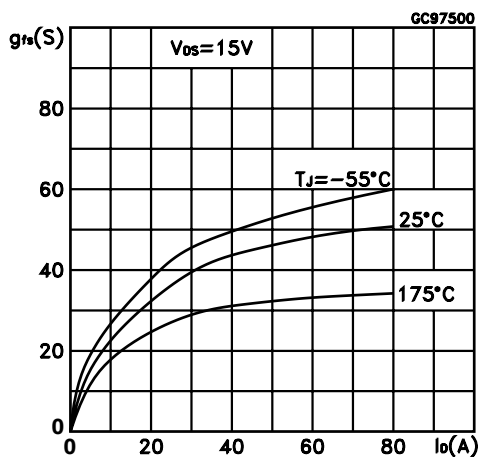
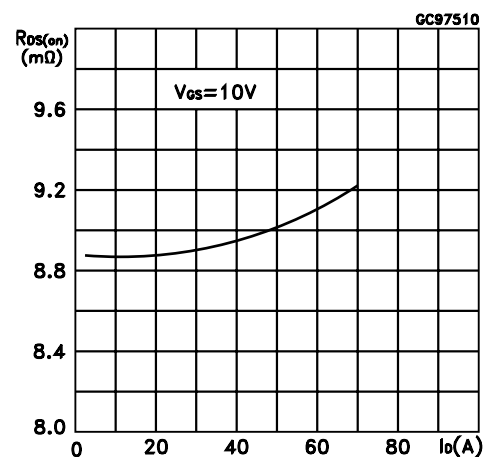
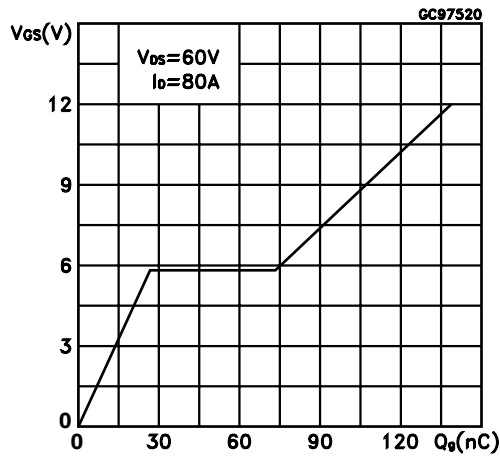
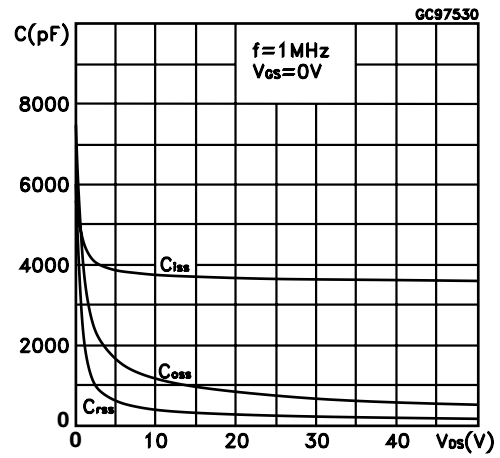
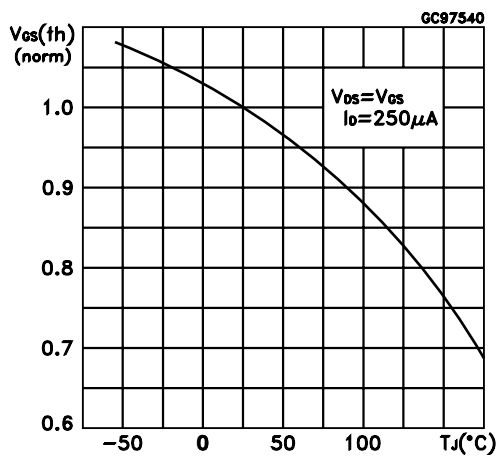
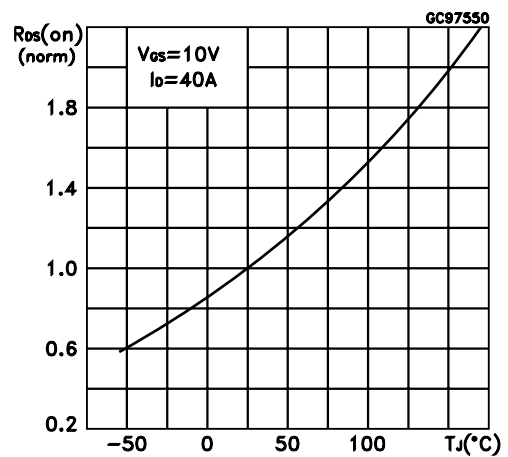
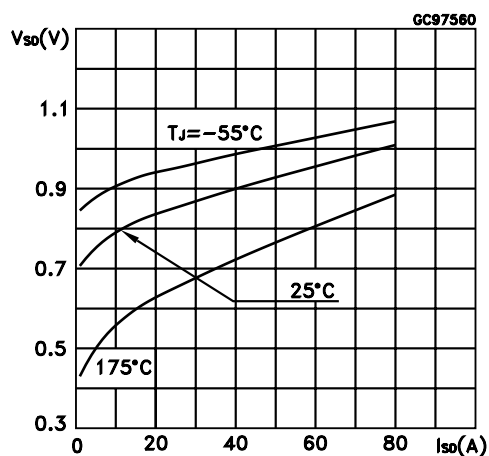
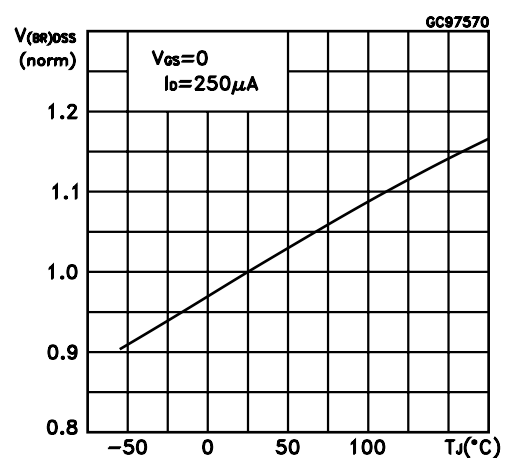
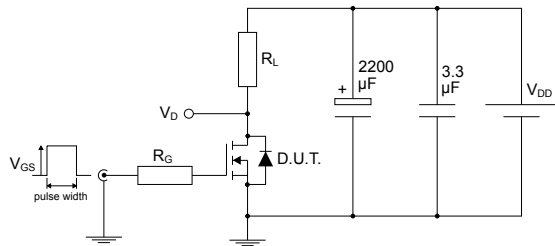


Figure 6. Static drain-source on-resistance

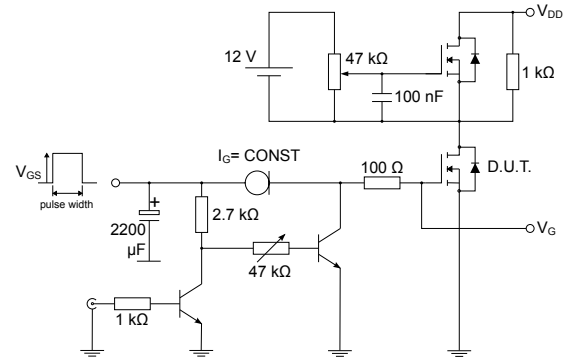


**Figure 7. Gate charge vs gate-source voltage**

**Figure 8. Capacitance variations**

**Figure 9. Normalized gate threshold voltage vs temperature**

**Figure 10. Normalized on-resistance vs temperature**

**Figure 11. Typical reverse diode forward characteristics**

**Figure 12. Normalized  $V_{(BR)DSS}$  vs temperature**


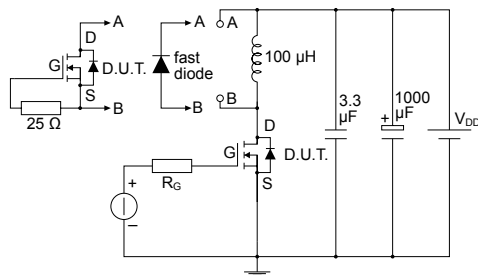
### 3 Test circuits

**Figure 13. Test circuit for resistive load switching times**


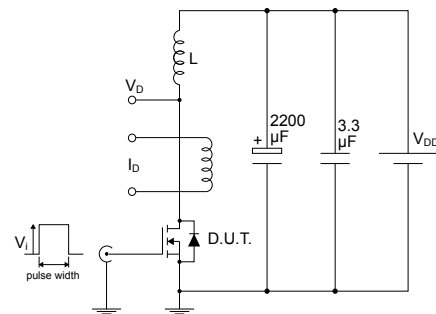
AM01468v1

**Figure 14. Test circuit for gate charge behavior**


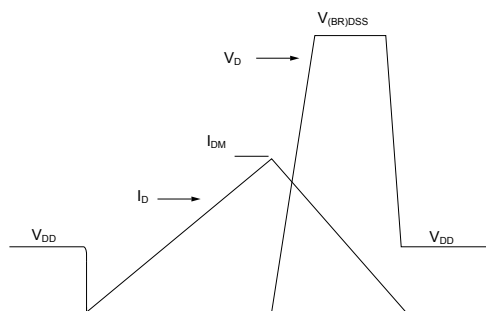
AM01469v1

**Figure 15. Test circuit for inductive load switching and diode recovery times**


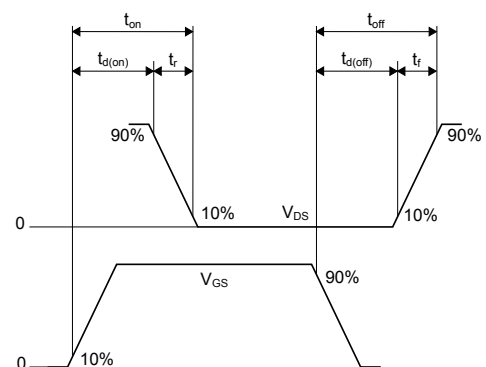
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**Figure 16. Unclamped inductive load test circuit**


AM01471v1

**Figure 17. Unclamped inductive waveform**


AM01472v1

**Figure 18. Switching time waveform**


AM01473v1

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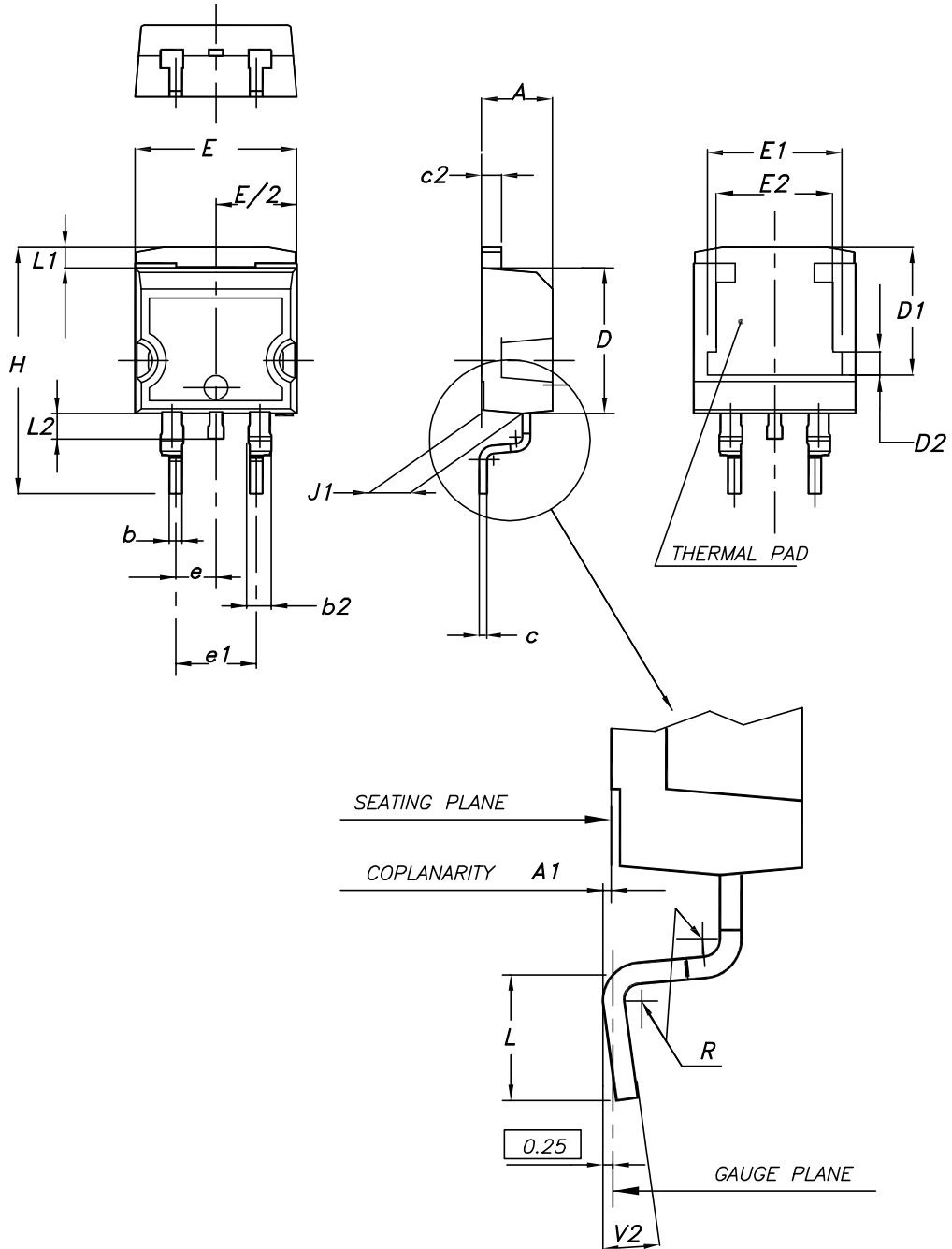
## 4 Package information

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To meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions, and product status are available at: [www.st.com](http://www.st.com). ECOPACK is an ST trademark.

### 4.1 D<sup>2</sup>PAK (TO-263) type A package information

Figure 19. D<sup>2</sup>PAK (TO-263) type A package outline

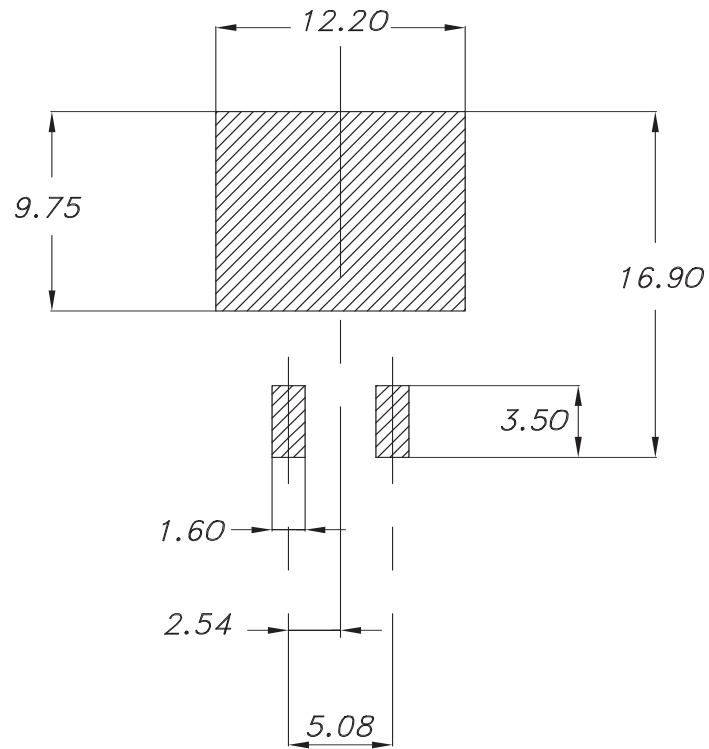


0079457\_27

**Table 7. D<sup>2</sup>PAK (TO-263) type A package mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
A1	0.03		0.23
b	0.70		0.93
b2	1.14		1.70
c	0.45		0.60
c2	1.23		1.36
D	8.95		9.35
D1	7.50	7.75	8.00
D2	1.10	1.30	1.50
E	10.00		10.40
E1	8.30	8.50	8.70
E2	6.85	7.05	7.25
e		2.54	
e1	4.88		5.28
H	15.00		15.85
J1	2.49		2.69
L	2.29		2.79
L1	1.27		1.40
L2	1.30		1.75
R		0.40	
V2	0°		8°

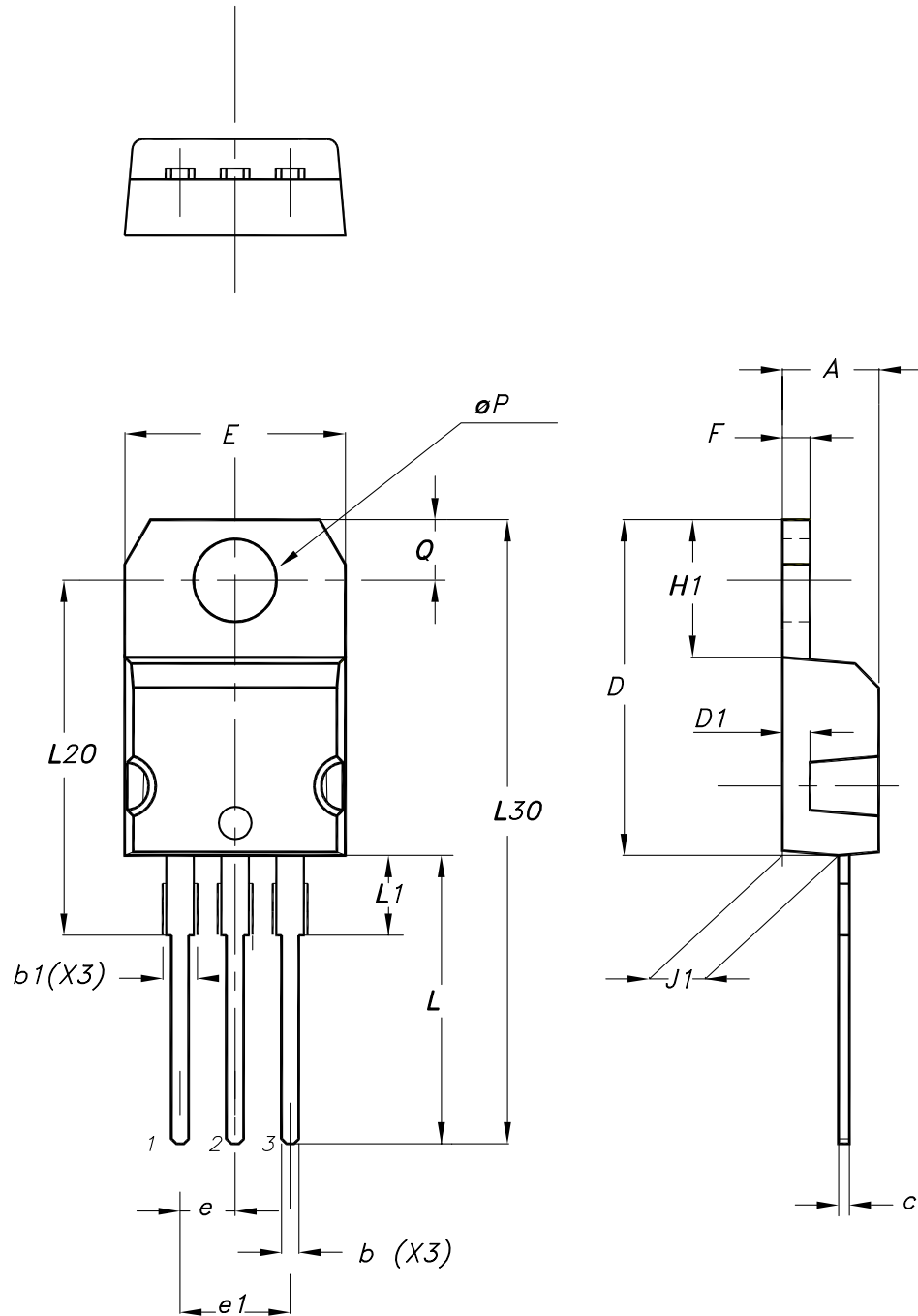
Figure 20. D<sup>2</sup>PAK (TO-263) recommended footprint (dimensions are in mm)



0079457\_Rev27\_footprint

## 4.2 TO-220 type A package information

Figure 21. TO-220 type A package outline



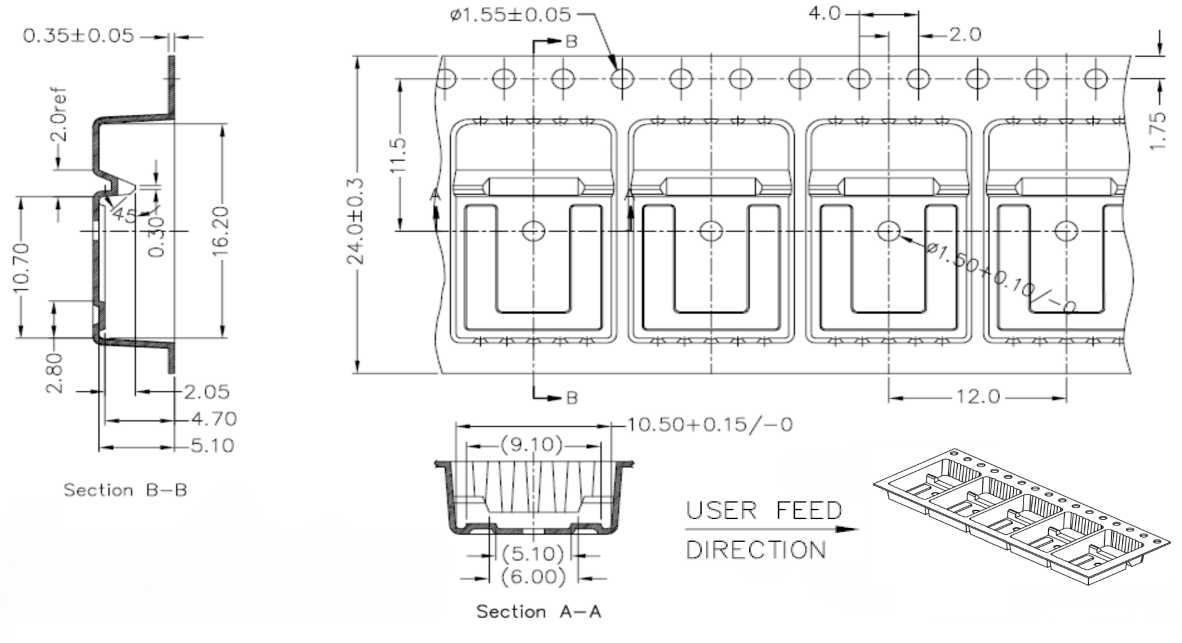
0015988\_typeA\_Rev\_24

**Table 8. TO-220 type A package mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.55
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10.00		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13.00		14.00
L1	3.50		3.93
L20		16.40	
L30		28.90	
øP	3.75		3.85
Q	2.65		2.95
Slug flatness		0.03	0.10

### 4.3 D<sup>2</sup>PAK packing information

Figure 22. D<sup>2</sup>PAK tape drawing (dimensions are in mm)



DM01095771\_2

## Revision history

**Table 9. Document revision history**

Date	Version	Changes
25-Jul-2007	1	First release.
14-Dec-2009	2	Added new package, mechanical data: I <sup>2</sup> PAK.
28-Jan-2026	3	Removed order code STI76NF75. Updated <a href="#">Section 4: Package information</a> . Minor text changes.

## Contents

<b>1</b>	<b>Electrical ratings</b> .....	<b>2</b>
<b>2</b>	<b>Electrical characteristics</b> .....	<b>3</b>
<b>2.1</b>	Electrical characteristics (curves) .....	<b>5</b>
<b>3</b>	<b>Test circuits</b> .....	<b>7</b>
<b>4</b>	<b>Package information</b> .....	<b>8</b>
<b>4.1</b>	D <sup>2</sup> PAK (TO-263) type A package information .....	<b>9</b>
<b>4.2</b>	TO-220 type A package information .....	<b>12</b>
<b>4.3</b>	D <sup>2</sup> PAK packing information .....	<b>14</b>
	<b>Revision history</b> .....	<b>15</b>

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